Space Weather Forecast

Issued on Sunday, 25 June 2023 at 13:28 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of R1/R2 Radio Blackouts throughout. Slight chance of G1/Minor Geomagnetic Storm conditions on day 3 (27 Jun).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with one Moderate-flare observed from a small sunspot in the northwest. There are currently fourteen sunspot regions on the visible disc, however almost all are small and magnetically simple. The largest and most complex group is in the northwest, and has undergone some growth in the period but as yet to produce a significant flare. Another small sunspot near the one that produce the M-flare has also been showing some slight growth, producing the largest of the Common class flares observed. No new Earth-directed CMEs (coronal mass ejections) have been observed.

Solar Wind / Geomagnetic Activity: The solar wind showed the signature of a CME arrival, likely a glance from the CME from the Strong flare on 20 Jun. This likely arrived around 24/1915 UTC, with speed rising from slightly elevated to be elevated at around 540 km/s. The total magnetic field strength also rose from background to peak at Moderate levels 24/1915-2100 UTC, then declined slightly again. The north-south component was initially weak and variable in direction, but became predominately negative (southward) with the CME arrival. A rotation to northward (positive) values followed around 25/0100 UTC and persisted for the rest of the period. Geomagnetic activity was Quiet to Unsettled (Kp2-3), with 1 Active (Kp4) interval 24/2100-2400 UTC and 1 G1/Minor Storm (Kp5) 25/0000-0300 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has been at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low to Moderate, with isolated Moderate-class flares possible.

Solar Wind / Geomagnetic Activity: There is a CME that may glance Earth on day 3 (27 Jun), from the Moderate flare that occurred on the 22 Jun. Otherwise currently elevated solar winds are expected to ease to slightly elevated levels. Further coronal hole sourced enhancements are then possible from day 3 (27 Jun) onward however these are low confidence. Geomagnetic activity is expected to be Quiet with isolated Unsettled to Active intervals possible day 1 (25 Jun) and just a slight chance of a G1/Minor storm interval as the magnetic cloud of the recent CME arrival recedes. This becoming mostly Quiet day 2 (26 Jun). Potentially rising to Unsettled to Active, with a slight chance of G1 Minor Storms day 3 or 4 (27 or 28 Jun).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background with no solar radiation storms occurring. There is a slight chance of count rates increasing however, if any notable flares occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	5	5	10	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	40	40	40	40
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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